

LOW PRESSURE

## Fluid Regulator

306563L

EN

**For accurate, positive control of fluid pressure to *one* spray gun, dispensing valve, or atomizing head. For professional use only.**

*250 psi (18 bar, 1.8 MPa) Maximum Inbound Pressure*



### **Important Safety Instructions**

Read all warnings and instructions in this manual.  
Save these instructions.

### **Model 203831 Series H**

*0–60 psi (0–4 bar, 0–0.4 MPa) Regulated Pressure*

Gives positive control of fluid pressures in most normal direct supply and circulating spray systems.

### **Model 204500 Series H**

*0–15 psi (0–1 bar, 0–0.1 MPa) Regulated Pressure*

Has a counterbalance spring for positive closure at extremely low pressures.

### **Model 204501 Series H**

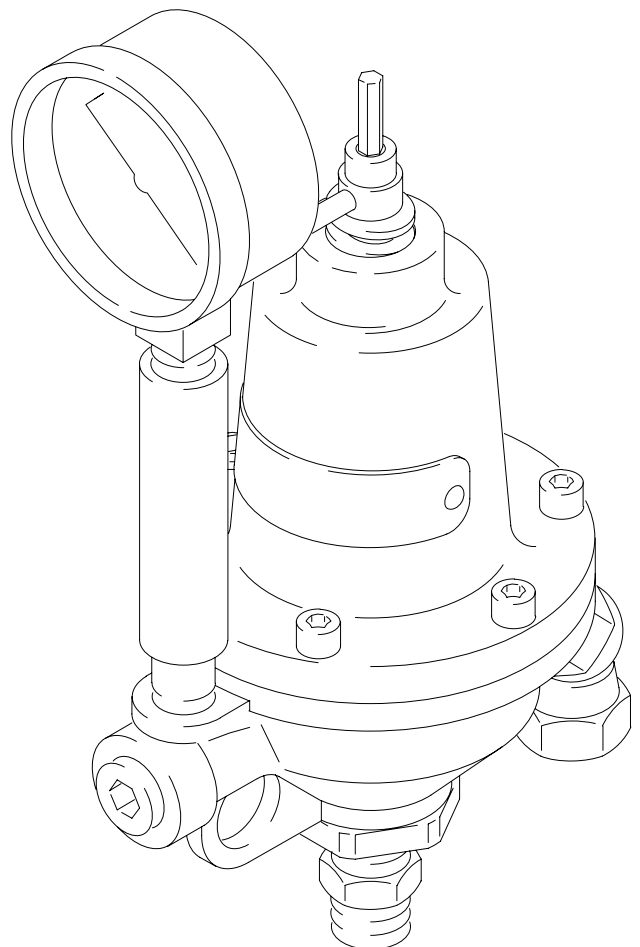
*20–160 psi (1.5–11 bar, 0.15–1.1 MPa) Regulated Pressure*

Has a heavier spring for precise control of fluid in the regulated range.

### **Model 205425 Series H**

*0–60 psi (0–4 bar, 0–0.4 MPa) Regulated Pressure*

has a large valve for more viscous fluids. Not intended for use with standard paints and lighter viscosity fluids, as these fluids lower the sensitivity of this regulator.



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## Symbols

### Warning Symbol



This symbol alerts you to the possibility of serious injury or death if you do not follow the instructions.

### Caution Symbol



This symbol alerts you to the possibility of damage to or destruction of equipment if you do not follow the instructions.

## ! WARNING



INSTRUCTIONS

### EQUIPMENT MISUSE HAZARD

Equipment misuse can cause the equipment to rupture or malfunction and result in serious injury.

- This equipment is for professional use only.
- Read all instruction manuals, tags, and labels before operating the equipment.
- Use the equipment only for its intended purpose. If you are not sure, call your Graco distributor.
- Do not alter or modify this equipment.
- Check equipment daily. Repair or replace worn or damaged parts immediately.
- Do not exceed the maximum working pressure stated on the equipment or in the **Technical Data** for your equipment. Do not exceed the maximum working pressure of the lowest rated component in your system.
- Use fluids and solvents which are compatible with the equipment wetted parts. Refer to the **Technical Data** section of all equipment manuals. Read the fluid and solvent manufacturer's warnings.
- Handle hoses carefully. Do not pull on hoses to move equipment.
- Route hoses away from traffic areas, sharp edges, moving parts, and hot surfaces. Do not expose Graco hoses to temperatures above 66°C (150°F) or below -40°C (-40°F).
- Wear hearing protection when operating this equipment.
- Do not move or lift pressurized equipment.
- Comply with all applicable local, state, and national fire, electrical, and safety regulations.

# ! WARNING



## SKIN INJECTION HAZARD

Spray from the gun, leaks or ruptured components can inject fluid into your body and cause extremely serious injury, including the need for amputation. Fluid splashed in the eyes or on the skin can also cause serious injury.

- Fluid injected into the skin is a serious injury. The injury may look like just a cut, but it is a serious injury. Get immediate surgical attention.
- Do not stop or deflect leaks with your hand, body, glove or rag.
- Always have the tip guard and the trigger guard on the gun when spraying.
- Check the gun diffuser operation weekly. Refer to the gun manual.
- Be sure the gun trigger safety operates before spraying.
- Lock the gun trigger safety when you stop spraying.
- Follow the **Pressure Relief Procedure** for your equipment if the spray tip clogs and before cleaning, checking or servicing the equipment.
- Tighten all fluid connections before operating the equipment.
- Check the hoses, tubes, and couplings daily. Replace worn or damaged parts immediately. Do not repair high pressure couplings; you must replace the entire hose.
- Fluid hoses must have spring guards on both ends, to help protect them from rupture caused by kinks or bends near the couplings.



## MOVING PARTS HAZARD

Moving parts can pinch or amputate your fingers.

- Keep clear of all moving parts when starting or operating the pump.
- Before checking or servicing the equipment, follow the **Pressure Relief Procedure** for your system to prevent the equipment from starting unexpectedly.

# WARNING



## FIRE AND EXPLOSION HAZARD

Improper grounding, poor ventilation, open flames or sparks can cause a hazardous condition and result in a fire or explosion and serious injury.



- If there is any static sparking or you feel an electric shock while using this equipment, **stop spraying immediately**. Do not use the equipment until you identify and correct the problem.
- Provide fresh air ventilation to avoid the buildup of flammable fumes from solvents or the fluid being sprayed.
- Keep the spray area free of debris, including solvent, rags, and gasoline.
- Before operating this equipment, electrically disconnect all equipment in the spray area.
- Before operating this equipment, extinguish all open flames or pilot lights in the spray area.
- Do not smoke in the spray area.
- Do not turn on or off any light switch in the spray area while spraying or while operating if fumes are present.
- Do not operate a gasoline engine in the spray area.



## TOXIC FLUID HAZARD

Hazardous fluid or toxic fumes can cause serious injury or death if splashed in the eyes or on the skin, inhaled, or swallowed.

- Know the specific hazards of the fluid you are using.
- Store hazardous fluid in an approved container. Dispose of hazardous fluid according to all local, state and national guidelines.
- Always wear protective eyewear, gloves, clothing and respirator as recommended by the fluid and solvent manufacturer.

# Installation

## KEY

- A Regulator
- B Dispensing Unit
- C Gauge
- D Regulator Inlet
- E Regulator Outlet
- F Air Regulator
- G Supply Line
- H Accessory Outlet

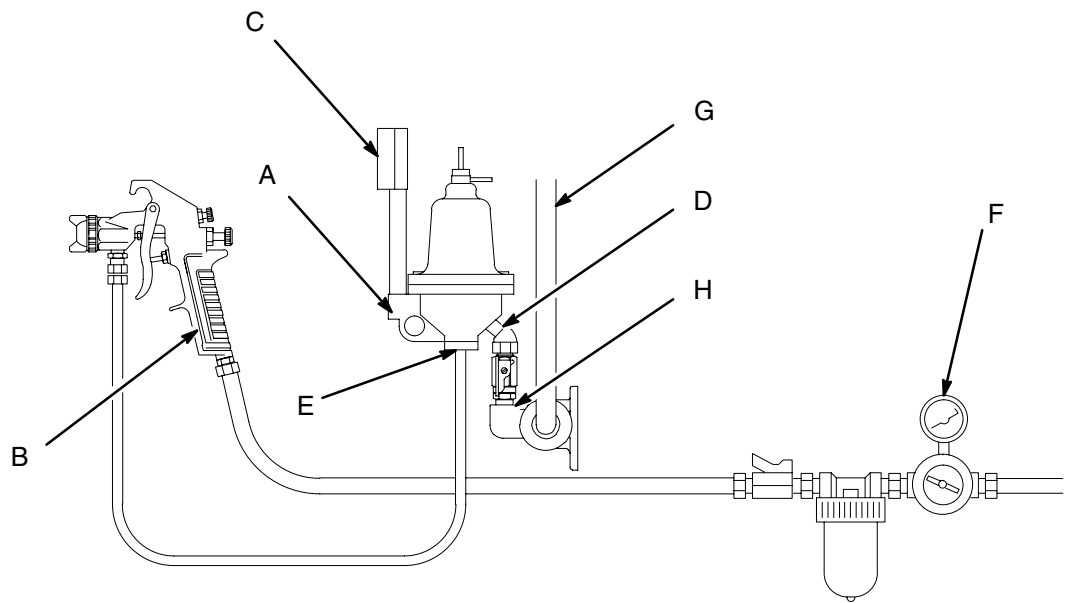


Fig. 1

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## TYPICAL INSTALLATION

### **CAUTION**

Before installing the regulator, check the tightness of the screws (1). Refer to Fig. 3 for the tightening sequence and the torque value. If the regulator leaks during operation, check and torque the screws again.

In order to prevent damaging the regulator, blow out and flush the supply line to remove any particles.

- Install regulator (A) in fluid supply line as close as possible to spray gun or dispensing valve (B) for easy operator control.
- Mount the regulator in an upright position so that the gauge (C) can be easily read.
- If turning the gauge, reapply sealer to the threads, and use a wrench on the inlet stud to turn gauge. Regulator inlet (D) is 3/8 npsm (f) swivel and outlet (E) is 3/8 npsm (m) rigid.
- Connect a fluid hose to regulator outlet (E) and spray gun. Connect an air atomizing hose to the spray gun and air regulator (F) See Fig. 1.
- To mount the regulator in a circulating system supply line (G), install an accessory outlet (H). One outlet (H) and air regulator (F) are required for each spray gun. The accessory outlet (Part No. 204819) may be ordered separately.

# Operation

## **⚠ WARNING**

To reduce the risk of component rupture, which can cause a fire or explosion and result in serious bodily injury, including splashing in the eyes, *never exceed 250 psi (18 bar, 1.8 MPa) Maximum Inbound Fluid Pressure* to this regulator.

## **⚠ CAUTION**

Do not pressure test the regulator with air; use solvent. Air may cause leaks between the fluid seals and result in fluid leaks during normal operation.

If the rest of the system must be pressure tested with air, loop past the regulator during the test.

1. Insert hex end of key (25) in adjusting screw (20) and turn counterclockwise until spring tension is relieved. See Figs 2 and 3.
2. Start pump and open shutoff valve of outlet (H) to admit fluid to regulator. Turn key (25) clockwise until desired fluid pressure shows on gauge.

## **⚠ CAUTION**

Do not exceed the *Regulated Pressure* specification of your regulator. Pressures higher than specified can damage the gauge.

**Note:** When reducing pressure, relieve pressure in gun and supply line to ensure a correct gauge reading.

## CLEANING THE REGULATOR

**Note:** Flush the regulator every four weeks, or as necessary for the amount and type of use.

1. Clear regulator of paint or other fluid by blowing back fluid through the gun and hose.
2. Shut off supply pump and relieve line pressure by opening back pressure regulator or other by-pass valve.
3. Open regulator valve by screwing the threaded portion of key (25) as far as possible into the cap. See Fig. 2.
4. Loosen air cap ring of spray gun three turns, hold a rag firmly over the end of the cap and trigger the gun. Air will force fluid back through the gun, hose and regulator.
5. After blow-back, remove the adjusting key (25)

**Note:** Do not use the threaded end of key (25) to adjust pressure.

6. Flush regulator until clean.

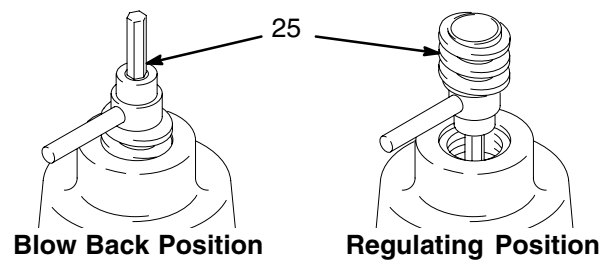


Fig. 2

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# Troubleshooting

<b>Problem</b>	<b>Cause</b>	<b>Solution</b>
No pressure regulation	Damaged diaphragm	Replace diaphragm (31).
Fluid leaks under cap	Loose cap, worn gasket	Tighten screws (1), replace gasket (32).
	Damaged diaphragm	Replace diaphragm (31).
Pressure creeps above setting	Loose cap	Tighten screws (1).
	Worn gasket	Replace gasket (32).
	Damaged diaphragm	Replace diaphragm (31).
	Worn or held open fluid valve	Flush regulator, replace fluid valves (26 & 27) if worn excessively.
Pressure drops below setting	Loose cap	Tighten screws (1).
	Worn gasket	Replace gasket (32).
	Blocked fluid supply line or valve	Flush supply line and valve, service if necessary.
	Using regulator beyond capacity	Do not use regulator beyond its rated capacity.

# Service

## Regulator Disassembly

**Note:** Repair Kit 222657 is available for Models 204501 and 203831. See page 11 for parts included in the kit. Purchase the kit separately.

Shut off pump, close shutoff valve and relieve pressure in regulator by triggering the spray gun. Remove the regulator from the system.

1. Using the hex end of key (25), adjust screw (20) all the way counterclockwise to relieve regulator spring tension.
2. Remove outlet bushing (15) and counter-balance spring (29) (Model 204500 only) from the body.
3. Unscrew valve stem (27) from diaphragm hanger (28) with adjusting key. See Fig. 3.
4. Remove screws (1), regulator cap (17), spring adjusting screw (20), spring (13), and spring cap (30) (Model 204500 only).
5. Lift diaphragm (31) and hanger from body. Disassemble the hanger and diaphragm only if damaged.
6. Unscrew valve seat (26) from body with a 9/16" socket wrench. See Fig. 3.
7. Thoroughly inspect all parts and inspect for wear or damage, replacing as necessary.

## CAUTION

Use special care in handling the valve stem and seat to avoid damaging the hard carbide parts.

## Regulator Reassembly

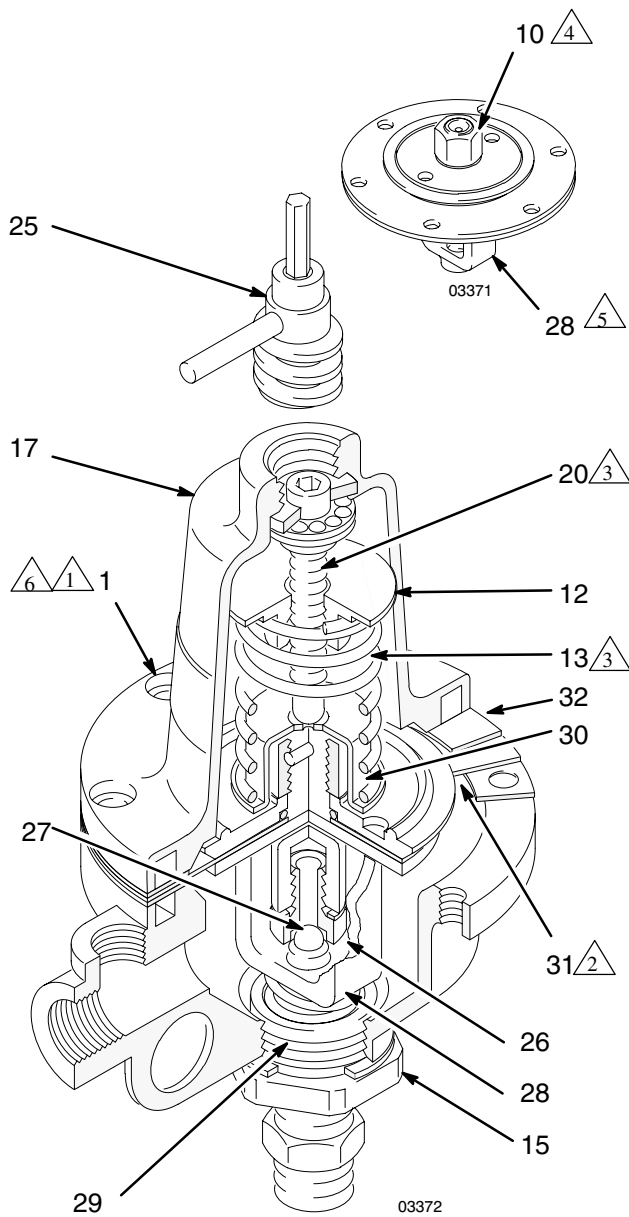
Reassemble regulator in reverse order of **Disassembly**. When inserting the diaphragm and hanger, be sure that all surfaces are clean and smooth. Any dirt or roughness could damage the diaphragm.

**Note:** Hold hanger (28) and valve stem (27) in place with a finger so that the valve stem is correctly lined up with the valve seat (26).

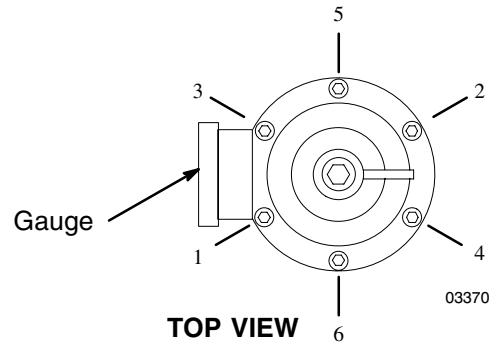
The hanger should be in line with one set of holes and the nut should be torqued to 20 ft-lb (27 N•m). Turn the valve stem snugly against the seat and then back off 1/2 turn on model 204500 and 3/4 turn on other models to set valve clearance. When installing the cap (17), line up finger of spring adjusting nut (12) with the groove in the cap (17). Torque the six screws (1) evenly to 120–130 in-lb (13.6–14.7 N•m) three times consecutively, in the order shown in the **TOP VIEW**, to compensate for diaphragm relaxation. See Fig. 3.

**Note:** If further service is needed, see notes on lubrication, thread sealant, and torque values in Fig. 4.





- △1 See **TOP VIEW** for tightening sequence.
- △2 Lubricate with oil.
- △3 Lubricate with grease.
- △4 Torque to 20 ft-lb (27 N•m).
- △5 Hanger must be parallel to diaphragm holes.
- △6 Torque to 120–130 in-lb (13.6–14.7 N•m).



**Fig. 3**

# Parts

△<sub>1</sub> See torque sequence in Fig. 3.

△<sub>2</sub> Lubricate with grease.

△<sub>3</sub> PTFE side down.

△<sub>4</sub> Apply sealant to threads.

△<sub>5</sub> Torque to 70–80 in-lb (8–9 N•m).

△<sub>6</sub> Lubricate with oil.

△<sub>7</sub> Torque to 30–35 ft-lb (41–47 N•m)

\* Recommended “tool box” spare parts. Keep on hand to reduce down time.

‡ These parts are included in Repair Kit 222657, which may be purchased separately. The kit is for use with Models 204501 and 203831 only.

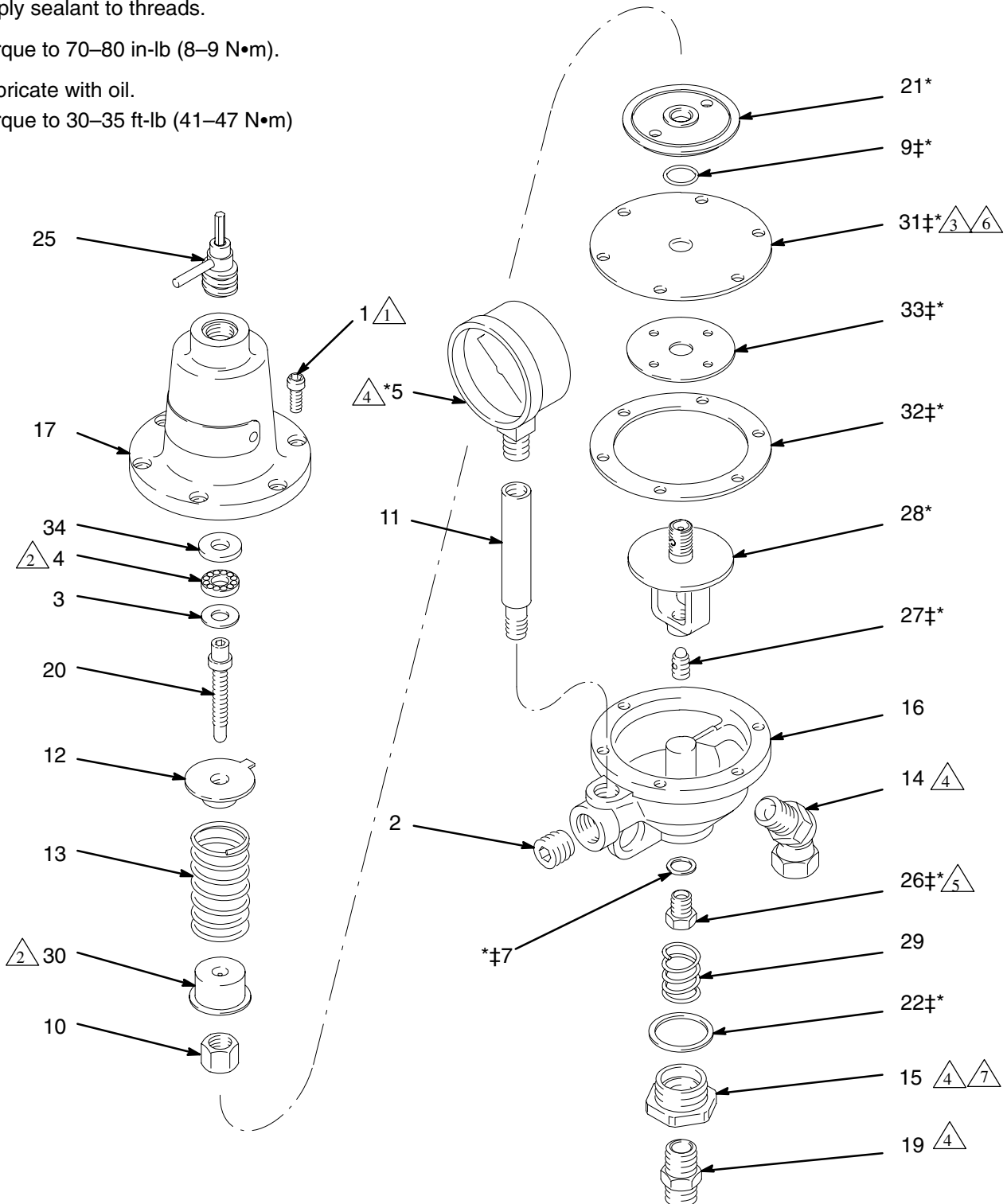


Fig. 4

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# Parts

Ref No.	Part No.	Description	Qty.	Ref No.	Part No.	Description	Qty.
1	101682	SCREW, soc hd cap; 1/4–20 x 5/8	6	20	164863	SCREW, adjusting	1
2	101754	PLUG, pipe; hex soc; 3/8 npt	1	21*	164864	PLATE, diaphragm	1
3	101971	RACE, thrust; adjusting nut	1	22*	171198‡	GASKET, acetal	1
4	101972	BEARING, needle thrust	1	25	204522	KEY, regulating (removable)	1
5*	187875	GAUGE, fluid pressure; 0–30 psi (0–2 bar) (Model 204500 only)	1	26*	204523‡	SEAT, valve (Models 203831 & 204501 only)	1
	101180	GAUGE, fluid pressure; 0–200 psi (0–13 bar) (Model 204501 only)	1		206523	SEAT, valve (Model 204500 only)	1
	101176	GAUGE, fluid pressure; 0–60 psi (0–4 bar) (Models 205425 & 203831 only)	1		212030	SEAT, valve (Model 205425 only)	1
				27*	206920	STEM, valve (Model 204500 only)	1
					204524‡	STEM, valve (Models 204501 & 203831 only)	1
7*	150670‡	GASKET, copper	1		205183	STEM, valve (Model 205425 only)	1
9*	157277‡	SEAL, o-ring; thiokol	1	28*	206921	HANGER, diaphragm	1
10	160741	NUT, lock; diaphragm	1	29	153996	SPRING, helical compression (Model 204500 only)	1
11	160745	TUBE, gauge mounting	1	30	166618	CAP, spring (Model 204500 only)	1
12	161349	NUT, spring adjusting	1	31*	172193‡	DIAPHRAGM	1
13	161351	SPRING, flat compression (Models 203831 & 205425 only)	1	32*	171912‡	GASKET; cellulose fiber	1
	166617	SPRING, helical compression (Model 204500 only)	1	33*	171913‡	GASKET; cellulose fiber	1
	160034	SPRING, helical compression (Model 204501 only)	1	34	171193	WASHER, plain	1
				* Recommended "tool box" spare parts. Keep on hand to reduce down time.			
14	161889	UNION 45° swivel; 3/8 npt(m) x 3/8 npsm(f)	1	‡ These parts are included in Repair Kit 222657, which may be purchased separately. The kit is for use with Models 204501 and 203831 only.			
15	161357	BUSHING, fluid outlet	1				
16	161358	BODY, regulator	1				
17	171194	CAP, regulator	1				
19	162485	ADAPTER; 3/8 npt x 3/8 npsm	1				

## Dimensions

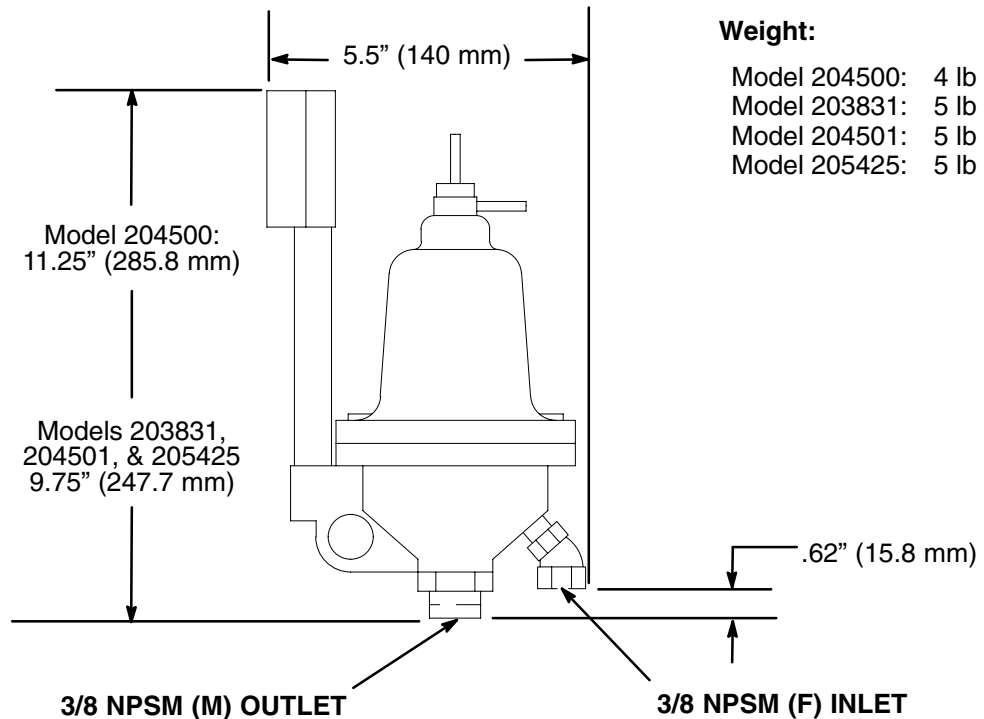


Fig. 5

# The Graco Warranty and Disclaimers

## WARRANTY

Graco warrants all equipment listed in this manual which is manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale by an authorized Graco distributor to the original purchaser for use. Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

This warranty does not cover, and Graco shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-Graco component parts. Nor shall Graco be liable for malfunction, damage or wear caused by the incompatibility of Graco equipment with structures, accessories, equipment or materials not supplied by Graco, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Graco.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Graco distributor for verification of the claimed defect. If the claimed defect is verified, Graco will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

**THIS WARRANTY IS EXCLUSIVE, AND IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.**

Graco's sole obligation and buyer's sole remedy for any breach of warranty shall be as set forth above. The buyer agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss) shall be available. Any action for breach of warranty must be brought within two (2) years of the date of sale.

**GRACO MAKES NO WARRANTY, AND DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE IN CONNECTION WITH ACCESSORIES, EQUIPMENT, MATERIALS, OR COMPONENTS SOLD BUT NOT MANUFACTURED BY GRACO.** These items sold, but not manufactured by Graco (such as electric motors, switches, hose, etc.) are subject to the warranty, if any, of their manufacturer. Graco will provide purchaser with reasonable assistance in making any claim for breach of these warranties.

### For Sales to Canadian Customers:

Except as expressly stated herein, Graco makes no representations, warranties or conditions, express, implied or collateral, concerning any goods or services sold, and **GRACO SHALL NOT BE LIABLE IN ANY MANNER FOR** any other representation, warranty or condition of any kind, whether arising by operation of law or otherwise, including but not limited to, **WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.**

## LIMITATION OF LIABILITY

In no event will Graco be liable for indirect, incidental, special or consequential damages resulting from Graco supplying equipment hereunder, or for the furnishing, performance, or use of any products or other goods sold hereto, whether due to a breach of contract, breach of warranty, the negligence of Graco, or otherwise.

# Graco Information

For the latest information about Graco products, visit [www.graco.com](http://www.graco.com).

**TO PLACE AN ORDER**, contact your Graco distributor or call to identify the distributor closest to you:

**Phone:** 612-623-6921 or **Toll Free:** 1-800-328-0211 **Fax:** 612-378-3505

*All written and visual data contained in this document reflects the latest product information available at the time of publication. Graco reserves the right to make changes at any time without notice.*

Original instructions. This manual contains English. MM 306563

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